HYPERVELOCITY IMPACT TECHNOLOGY FACILITY

HITF *FLASH TEST REPORT*

Lyndon B. Johnson Space Center • Building 267 • Mail Code C23C • Houston, TX 77058

Test Program: Alpha Magnetic Spectrometer (AMS) II Testing

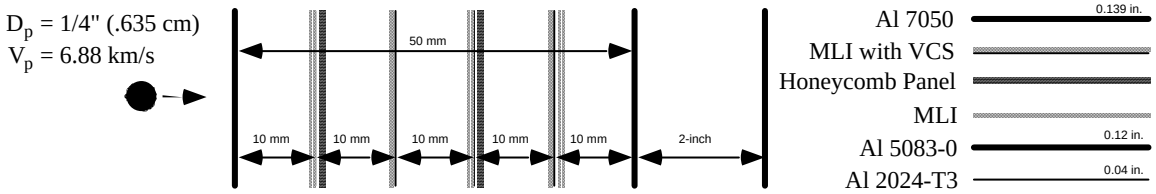
December 27, 2001

HITF System Analyst: Frankel Lyons (x45289)

Test #3 (WSTF No. 01-36728) (HITF HHW No. HITF01005)

Summary:

AMS II Test #3 was impacted normally (0°) by a 1/4-inch (6.35-mm) aluminum sphere traveling at 6.86 km/s. The White Sands Test Facility (WSTF) 0.50 caliber light gas gun was used for this test. The AMS II Test #3 configuration consist of a 3.54-mm (0.139-inch) thick 7050 aluminum bumper, 200 layers multi-layer insulation (MLI), (4)-0.125-mm (0.005-inch) 1100-0 aluminum vapor cooled shield plates, (2)-3.4-mm (0.134-inch) thick honeycomb support panels, a 3.06-mm (0.12-inch) thick 5083-0 aluminum rear wall and 0.040-inch (1.016-mm) thick 2024-T3 aluminum witness plate.



Projectile Shot Matrix

Material	Diameter	Mass	Impact Angle	Laser Velocity	Energy
Al 2017	1/4 in.	0.37368g	0°	6.86 km/s	8,792.6 J

Target Damage

The projectile impact created a 20-mm diameter entry hole through the 7075-T6 aluminum bumper. Layer 2 MLI has a 26-mm x 30-mm entry and 42-mm x 38-mm exit hole. Layer 2 VCS4 has a 40-mm x 41-mm entry hole and 46-mm x 51-mm jagged shaped exit hole with multiple petals 10-mm high. The layer 3 honeycomb support panel has a 42-mm diameter hole surrounded by a 12-mm high continuous petal. Layer 4 MLI has a 45-mm x 48-mm entry and 52-mm x 45-mm exit hole. Layer 4 VCS3 has a 66-mm x 48-mm entry hole and 80-mm x 78-mm jagged shaped exit hole with multiple petals 22-mm high. Layer 5 MLI has a 55-mm x 41-mm entry and 55-mm x 70-mm exit hole. Layer 5 VCS2 has a 78-mm x 61-mm entry hole and 95-mm x 83-mm jagged shaped exit hole with multiple petals 27-mm high. The layer 6 honeycomb support panel has a 96-mm x 81-mm hole surrounded by a 26-mm high continuous petal. Layer 7 MLI has a 55-mm x 50-mm entry and 65-mm x 60-mm exit hole. Layer 7 VCS1 has a 94-mm x 89-mm entry hole and layer 8 MLI has a 147-mm x 160-mm exit hole with 12 petals. The 5083-0 aluminum rear wall is deformed a maximum of 20-mm and has a black residue that forms a 300-mm x 300-mm starburst with aluminum splash and several craters of which the largest measures 1.25-mm diameter. The back of the rear wall has a 36-mm high bulge.

Conclusions

This target passed. The rear wall has no hole or perforation.